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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Kazumasa Ueda, et al

Serial No.: 09/756,140

Group Art Unit: 1755

Filed: January 9, 2001

Examiner: Michael A. Marcheschi

For: ABRASIVE FOR METAL

DECLARATION UNDER 37 C.F.R §1.132

Honorable Commissioner of Patents and Trademarks

Washington, D.C. 20231

Sir:

I, Yasuo Matsumi, a Japanese citizen residing at 2-13-10-206, Amakubo, Tsukuba-shi, Ibaraki, Japan, declare:

That I graduated from Osaka University, Department of Engineering, Graduate School of Osaka University, Department of Engineering molecular chemistry, master degree, in March 2000 and entered Sumitomo Chemical Company Limited in April 2000, in which company I have since then been engaged in research for IT related materials;

That I am familiar with the prosecution history of the identified application;

That the following experiment was conducted by me or under my direction.

Object of the Experiment

An object of the present experiment is to show the effect of using particle having a functional group capable of trapping a metal ion instead of using additives having a functional group capable of trapping a metal ion.

Etching Test

Etching rate was evaluated as follows:

A wafer having a copper film formed by sputtering was immersed in polishing composition for 10 min at 40 C. The thickness of copper film was calculated from electric resistant of the copper film and etching rate was estimated by the difference of thickness of the copper film before immersion and that after immersion.

Experimental 1.

The polishing composition of which pH was adjusted to 4 as obtained by Example 2 of the present specification was used for etching test. Etching rate was 92 Å/min.

Experimental 2.

Colloidal silica (trade name: Snowtex, manufactured by Nissan Chemical Ind.) as particle of inorganic oxide was used as abrasive for polishing. The abrasive concentration was adjusted to 2.5 % by weight, hydrogen peroxide concentration was adjusted to 1.5 % by weight and iminodiacetic acid disodium salt monohydrate as additives was adjusted to 0.5 % by weight, and then pH was adjusted to 4 with nitric acid to give a polishing composition. Polishing rate and etching rate were shown below.

Table

	Polishing rate (Å/min)	Etching rate (Å/min)
Experimental 1	1833 (Example 2)	92
Experimental 2	1962	294

Conclusion.

From the results shown above, it is apparent that an abrasive comprising a particle having a functional group capable of trapping a metal ion that is within the scope of the present invention showed high polishing rate and low etching rate. On the other hand, a polishing composition composed of particles having no functional group capable of trapping a metal ion and additives having a functional group capable of trapping a metal ion showed high etching rate.

That I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above identified application or patent issued thereon.

Date: September 18, 2002

Yasuo MATSUMI

Yasuo Matsumi